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*Like Ord. VII
to OLC 5/23
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file.*

In replying please address:

25X1

[Redacted]
P. O. Box No. 7
Station A
Columbus, Ohio

May 9, 1958

Dear Sir:

On the basis of a recent discussion with your technical representatives, we are submitting a proposed program for a two-month period of research directed toward the modification of an experimental electrically powered implement developed under Task Order No. L to assist in laying wire underground.

On February 1, 1955, an effort under Research Order No. 21 was undertaken to conduct research directed toward the development of an implement which would facilitate the laying of wire underground. The efforts of that program resulted in the development of a prototype gasoline-engine-powered device weighing only 94 pounds that could dig a trench 1-1/4 inches wide and 36 inches deep at a rate of about 4-1/2 feet per minute by means of a roller chain equipped with rip-saw-type teeth. Your technical representatives found that this experimental device was satisfactory from the standpoint of portability, ease of handling, and rate of trenching. However, during operation of the trencher, the noise from the power unit was so loud that the potential applicability of the device under certain field conditions appeared to be limited.

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On June 20, 1956, a program under Work Order No. VI, Task Order No. A, was initiated to investigate the feasibility of an electric-motor-driven device similar to the prototype gasoline-engine-powered trencher. Because of the successful outcome of this feasibility study, the program under Task Order No. L was undertaken on April 15, 1957, directed toward the development of two prototype electrically powered devices which would be powered by generating units that could be installed in a Volkswagen and would dig a trench 18 inches deep. Furthermore, one of the experimental electric-power-supply units was to be installed in a Volkswagen.

On April 25, 1958, the experimental devices developed under Task Order No. L were demonstrated to your representatives. In general, the performance of the various components was quite satisfactory. The experimental power-supply equipment in the Volkswagen functioned properly, and the experimental electrically powered trenching units were easy to handle and relatively quiet. The trenching rates obtained were of the order of 30 inches per minute. Since it was believed that the idling Volkswagen engine might be limiting the trenching rate, a motor-generator set was also used to power the experimental trenching units, so as to provide a basis for comparison when a greater energy source was used.

During a discussion of this demonstration, several minor modifications were suggested as improvements on the present

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experimental equipment. The objective of the program proposed herein is to conduct research directed toward the accomplishment of these modifications, which are described below:

(1) Because the experimental-trenching-unit wheel clears the bearing housing by only a fraction of an inch, it was suggested that minor damage to the wheel might easily cause interference with the bearing housing and prevent wheel rotation. Therefore, increased clearance should be provided between the wheel and the bearing housing.

(2) It has been found that the chain, when it breaks, tears holes in the neoprene-coated-fabric dirt deflector, and it appears worth while to develop a stronger deflector. Recent experiments have shown that, if the thickness of the fabric in the critical area is tripled, damage from the broken chain can be prevented. Therefore, it is contemplated that up to two deflectors of this design would be provided.

(3) One of the experimental-trencher motors has been enclosed by a sound-reducing box. It appears prudent to enclose the second motor in a similar fashion, and, further, to insert a fine mesh screen at the intake of each electric motor, to prevent damage from sucked-in foreign matter. In addition, the lightening holes in the base plate should be covered to reduce further the noise emanating from the experimental unit.

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(4) During the demonstration and subsequent operations, several of the chain links were damaged. The damaged chains for the experimental electrically powered units should be repaired.

(5) During the demonstration, it was found that small pieces of dirt could bind the timing belt of the experimental trenching unit sufficiently to prevent proper operation of the unit. Consideration should be given to providing a guard around the timing belt, so as to prevent binding difficulties of this type and, from a general standpoint, possible harm to the operator.

(6) The performance of the experimental trenching units during the demonstration and during subsequent rate-determination experiments indicated that the Volkswagen engine was not powerful enough at the desired idling speed to permit the maximum power to be derived from the electric-power-supply units. Although it is not feasible at this time to install the electric-power-supply units in a vehicle with a larger engine, nevertheless, some of the benefit that could be derived from such an installation could be achieved if the Volkswagen engine was run at a faster speed. Therefore, an extra set of pulleys and a second timing belt should be furnished so that the Volkswagen engine could be run at approximately 2,300 rpm while the power-supply unit was being driven. It is likely that such a system would provide all of the power that the electric-power-supply units might require.

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Also, it is planned to tune up the Volkswagen engine prior to delivery to your technical representatives, and to prepare some moving pictures and colored slides showing the various components, method of assembly, method of operation, etc.

We propose to undertake the above-described effort over a period of two months, starting on the date of acceptance of authorization from the Contracting Officer to proceed. The proposed effort could be conducted under Task Order No. R of our current contract. The Work Order would be a period-basis research agreement; it could be similar in form to those used previously under Task Order No. R and the same administrative procedures would be followed. The Work Order would require only that the effort be directed toward the objectives outlined above, within the limits of the time and funds provided.

It is estimated that an appropriation of \$2,307, including the fixed fee of \$131, is needed to fund the proposed program. A general breakdown of the estimated costs is attached.

At the conclusion of the proposed research period, we would submit a summary letter report describing the highlights of the activity performed.

Should any additional information be needed, please let us know. You may direct any inquiries of a contractual nature to Mr. V. E. Young, at Extension 159.

Very truly yours,



Vice President

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In Duplicate

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Proposal of the U. S. Government.
For Research on **Minor Modification of the Electric Trencher.**

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Based upon a period-basis Contract for a research period of **2 months.**

(Including time for submission of all reports. The proposed contract will not provide for earlier conclusion of the research.)

ESTIMATED COSTS

We expect that the cost of this research for the period indicated above may be distributed approximately as set forth hereon, subject to the understanding that this allocation is merely an estimate, and actual costs incurred may vary from the categories shown. We have determined that these estimates are reasonable and consistent with Battelle's established policies in its research for the various Government agencies, which policies are briefly discussed below and will be followed in determination of our actual costs hereunder.

Materials & Supplies, etc.

\$150

(Including any equipment which may be purchased as necessary in performance of the research. Charges of \$25 or less are excluded from this item.)

Use of Equipment and Technical Services, Travel, and Misc.

\$250

(Including applicable costs of technical research and service divisions, and use of technical equipment, except that any undistributed balances of these accounts will be included in overhead. Cost of travel includes reasonable actual subsistence expenses and the actual cost of transportation. An allowance of up to 8¢ per mile for all necessary travel by privately owned conveyance is included in lieu of the cost of such travel.)

Salaries & Wages

(Including our predetermined accrual for vacation, holiday, and sick-leave pay, pensions, and social security.)

Type of Employee	No. of Man-Months	Estimated Cost
Supervision	1/4	\$250
Research Engineers	1/2	350
Lab. Assistants	1	410
Steno., Clerical, Shop & Photo., etc.	1/4	100
Total Salaries & Wages		<hr/>

\$1,110

Overhead

60 per cent of salaries and wages, as they are defined above. Provisional monthly reimbursement will be at the rate of 56 per cent of salaries and wages, as so defined, or at such other provisional rate as may from time to time be mutually agreed upon with the Government's audit representatives. This is a provisional rate for current reimbursement, which we have arrived at by negotiation with Government representatives, and it will be subject to retroactive revision to the "actual" rate agreed upon with them for each calendar year following a detailed audit for that year. The item of overhead includes general research, charges of \$25 or less for materials and supplies, and other categories of costs we customarily include in our overhead account. Cash discounts on all purchases will be credited to overhead, instead of to the amount of the purchase. Scrap of appreciable value will be credited directly to the project. All other scrap will be credited to the overhead account, in which the Government participates.)

\$666

Total Estimated Cost

\$2,176

Fixed Fee

131

\$2,307

*Please let us have your acceptance in our hands by June 30, 1958 **Contract Price**
Unless we extend the time, your acceptance after that date will be subject to agreement.

10/57

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